WHAT IS CLAIMED IS:

1. A non-radiative dielectric waveguide comprising:

a pair of parallel planar conductors arranged at an interval of half or below of a high-frequency signal wavelength; and

a dielectric strip interposed between the parallel planar conductors, the dielectric strip having a 0.01 to 0.3 mm-wide chamfer formed at an edge portion in a transmission direction of the dielectric strip.

2. The non-radiative dielectric waveguide of claim 1,

wherein the chamfer is formed as a flat surface, and one width of the chamfer corresponding to a surface of the dielectric strip facing to the parallel planar conductor is made larger than the other width corresponding to a side surface of the dielectric strip.

3. The non-radiative dielectric waveguide of claim 1,

wherein the chamfer is formed as a convexly-curved surface, and one width of the chamfer corresponding to the surface of the dielectric strip facing to the parallel planar conductor is made larger than the other width corresponding to the side surface of the dielectric strip.

4. A non-radiative dielectric waveguide comprising:

a pair of parallel planar conductors arranged at an interval

of half or below of a high-frequency signal wavelength; and

a dielectric strip interposed between the parallel planar conductors, the dielectric strip being made of a ceramics having an open pore ratio of 5 % or less.

5. The non-radiative dielectric waveguide of claim 4, wherein the dielectric strip has an open pore ratio of 3 % or less.

6. The non-radiative dielectric waveguide of claim 1, wherein the dielectric strip is made of a ceramics including a complex oxide comprising Mg, Al and Si as a main component and having a Q value of 1000 or above at a measured frequency of 60 GHz.

7. The non-radiative dielectric waveguide of claim 2, wherein the dielectric strip is made of a ceramics including a complex oxide comprising Mg, Al and Si as a main component and having a Q value of 1000 or above at a measured frequency of 60 GHz.

8. The non-radiative dielectric waveguide of claim 3, wherein the dielectric strip is made of a ceramics including a complex oxide comprising Mg, Al and Si as a main component and having a Q value of 1000 or above at a measured frequency

of 60 GHz.

9. The non-radiative dielectric waveguide of claim 4, wherein the dielectric strip is made of a ceramics including a complex oxide comprising Mg, Al and Si as a main component and having a Q value of 1000 or above at a measured frequency of 60 GHz.

10. The non-radiative dielectric waveguide of claim 5, wherein the dielectric strip is made of a ceramics including a complex oxide comprising Mg, Al and Si as a main component and having a Q value of 1000 or above at a measured frequency of 60 GHz.

11. The non-radiative dielectric waveguide of claim 6, wherein the composition of the complex oxide by mole ratio is expressed by the following formula: $xMgO \cdot yAl_2O_3 \cdot zSiO_2$ (wherein x, y and z are numbers satisfying the x + y + z = 100 mole %, x representing 10 to 40 mole %, y representing 10 to 40 mole %, and z representing 20 to 80 mole %).

12. The non-radiative dielectric waveguide of claim 7, wherein the composition of the complex oxide by mole ratio is expressed by the following formula: $xMgO \cdot yAl_2O_3 \cdot zSiO_2$ (wherein x, y and z are numbers satisfying the x + y + z = 100 mole %,

x representing 10 to 40 mole %, y representing 10 to 40 mole %, and z representing 20 to 80 mole %).

13. The non-radiative dielectric waveguide of claim 8, wherein the composition of the complex oxide by mole ratio is expressed by the following formula: $xMgO \cdot yAl_2O_3 \cdot zSiO_2$ (wherein x, y and z are numbers satisfying the x + y + z = 100 mole %, x representing 10 to 40 mole %, y representing 10 to 40 mole %, and z representing 20 to 80 mole %).

14. The non-radiative dielectric waveguide of claim 9, wherein the composition of the complex oxide by mole ratio is expressed by the following formula: $xMgO \cdot yAl_2O_3 \cdot zSiO_2$ (wherein x, y and z are numbers satisfying the x + y + z = 100 mole %, x representing 10 to 40 mole %, y representing 10 to 40 mole %, and z representing 20 to 80 mole %).

15. The non-radiative dielectric waveguide of claim 10, wherein the composition of the complex oxide by mole ratio is expressed by the following formula: $xMgO \cdot yAl_2O_3 \cdot zSiO_2$ (wherein x, y and z are numbers satisfying the x + y + z = 100 mole %, x representing 10 to 40 mole %, y representing 10 to 40 mole %, and z representing 20 to 80 mole %).

16. A millimeter wave transmitting/receiving apparatus

comprising:

a pair of parallel planar conductors arranged at an interval of half or below of a millimeter wave signal wavelength;

a first dielectric strip having at its one end a high-frequency diode oscillator, the first dielectric strip propagating a millimeter wave signal outputted from the high-frequency diode oscillator;

a variable capacitance diode for outputting the millimeter wave signal as a frequency modulated transmission millimeter wave signal, by periodically controlling a bias voltage of the variable capacitance diode, the variable capacitance diode being arranged such that a direction in which the bias voltage is applied coincides with a direction of an electric field of the millimeter wave signal;

a second dielectric strip, one end of the second dielectric strip being disposed near the first dielectric strip so as to be electromagnetically coupled, or being joined to the first dielectric strip, the second dielectric strip propagating part of the millimeter wave signal toward a mixer;

a circulator having a first connection portion, a second connection portion, and a third connection portion arranged at predetermined spacings along a perimeter of a ferrite disk arranged in parallel to the parallel planar conductors, the connection portions serving as input/output terminals for the millimeter wave signal, the circulator outputting the millimeter

wave signal inputted into one of the connection portions from another connection portion that is adjacent in clockwise or counter-clockwise circulation within a plane of the ferrite disk, the first connection portion being connected to an output terminal of the millimeter wave signal of the first dielectric strip;

a third dielectric strip for propagating the millimeter wave signal, the third dielectric strip being joined to the second connection portion of the circulator and having a transmitting/receiving antenna disposed at its front end;

a fourth dielectric strip for propagating a received wave that is received by the transmitting/receiving antenna, propagated along the third dielectric strip, and outputted from the third connection portion of the circulator, toward the mixer; and

a mixer portion for generating an intermediate frequency signal by mixing part of the millimeter wave signal and a received wave, the mixer being made by placing an intermediate portion of the second dielectric strip near an intermediate portion of the fourth dielectric strip so that the second and fourth dielectric strips are electromagnetically coupled to, or joined to each other,

wherein the first, second, third, and fourth dielectric strips; the variable capacitance diode; the circulator; and the mixer portion are interposed between the parallel planar conductors,

and wherein, of the first to fourth dielectric strips, at least one is a non-radiative dielectric waveguide of one of claims 1 to 15.

17. A millimeter wave transmitting/receiving apparatus comprising:

a pair of parallel planar conductors arranged at an interval of half or below of a millimeter wave signal wavelength;

a first dielectric strip having at its one end a high-frequency diode oscillator, the first dielectric strip propagating a millimeter wave signal outputted from the high-frequency diode oscillator;

a variable capacitance diode for outputting the millimeter wave signal as a frequency modulated transmission millimeter wave signal, by periodically controlling a bias voltage of the variable capacitance diode, the variable capacitance diode being arranged such that a direction in which the bias voltage is applied coincides with a direction of an electric field of the millimeter wave signal;

a second dielectric strip, one end of the second dielectric strip being disposed near the first dielectric strip so as to be electromagnetically coupled, or being joined to the first dielectric strip, the second dielectric strip propagating part of the millimeter wave signal toward a mixer;

a circulator having a first connection portion, a second

connection portion, and a third connection portion arranged at predetermined spacings along a perimeter of a ferrite disk arranged in parallel to the parallel planar conductors, the connection portions serving as input/output terminals for the millimeter wave signal, the circulator outputting the millimeter wave signal inputted into one of the connection portions from another connection portion that is adjacent in clockwise or counter-clockwise circulation within a plane of the ferrite disk, the first connection portion being connected to an output terminal of the millimeter wave signal of the first dielectric strip;

a third dielectric strip for propagating the millimeter wave signal, the third dielectric strip being connected to the second connection portion of the circulator and having a transmitting antenna disposed at its front end;

a fourth dielectric strip having at its front end a receiving antenna and having its other end a mixer;

a fifth dielectric strip connected to the third connection portion of the circulator, the fifth dielectric strip propagating a millimeter wave signal received and mixed with the transmitting antenna and attenuating the millimeter wave signal at a non-reflective terminal end disposed at a front end of the fifth dielectric strip; and

a mixer portion for generating an intermediate frequency signal by mixing part of the millimeter wave signal and a received wave, the mixer being made by placing an intermediate portion

of the second dielectric strip near an intermediate portion of the fourth dielectric strip so that the second and fourth dielectric strips are electromagnetically coupled to, or joined to each other,

wherein the first, second, third, fourth, and fifth dielectric strips; the variable capacitance diode; the circulator; and the mixer portion are interposed between the parallel planar conductors,

and wherein, of the first to fifth dielectric strips, at least one is a non-radiative dielectric waveguide of one of claims 1 to 15.